Journal of Applied Mechanics and Technical Physics 2016 vol.57 N4, pages 720-730

Identification of the elastic and damping characteristics of carbon fiber-reinforced plastic based on a study of damping flexural vibrations of test specimens

Paimushin V., Firsov V., Gyunal I., Shishkin V.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, Pleiades Publishing, Ltd.A theoretical and experimental method for determining the elastic and damping characteristics of materials is proposed based on analysis of vibrograms of damping flexural vibrations of test specimens with different structures. It is shown that during tension–compression and shear of a carbon fiber-reinforced plastic made of Porcher 3692 carbon fabric and EDT-69NM polymer binder, its dynamic elastic modulus decreases considerably with increasing frequency of deformation in the range of 0–120 Hz. The amplitude dependences of the logarithmic vibration decrements of the carbon fiber-reinforced plastic are determined by minimizing the discrepancy between the experimental and calculated internal-damping parameters of the test specimens in tension–compression and shear.

http://dx.doi.org/10.1134/S0021894416040179

Keywords

aerodynamic damping, internal damping, objective function, test specimen, theoretical–experimental method